University News

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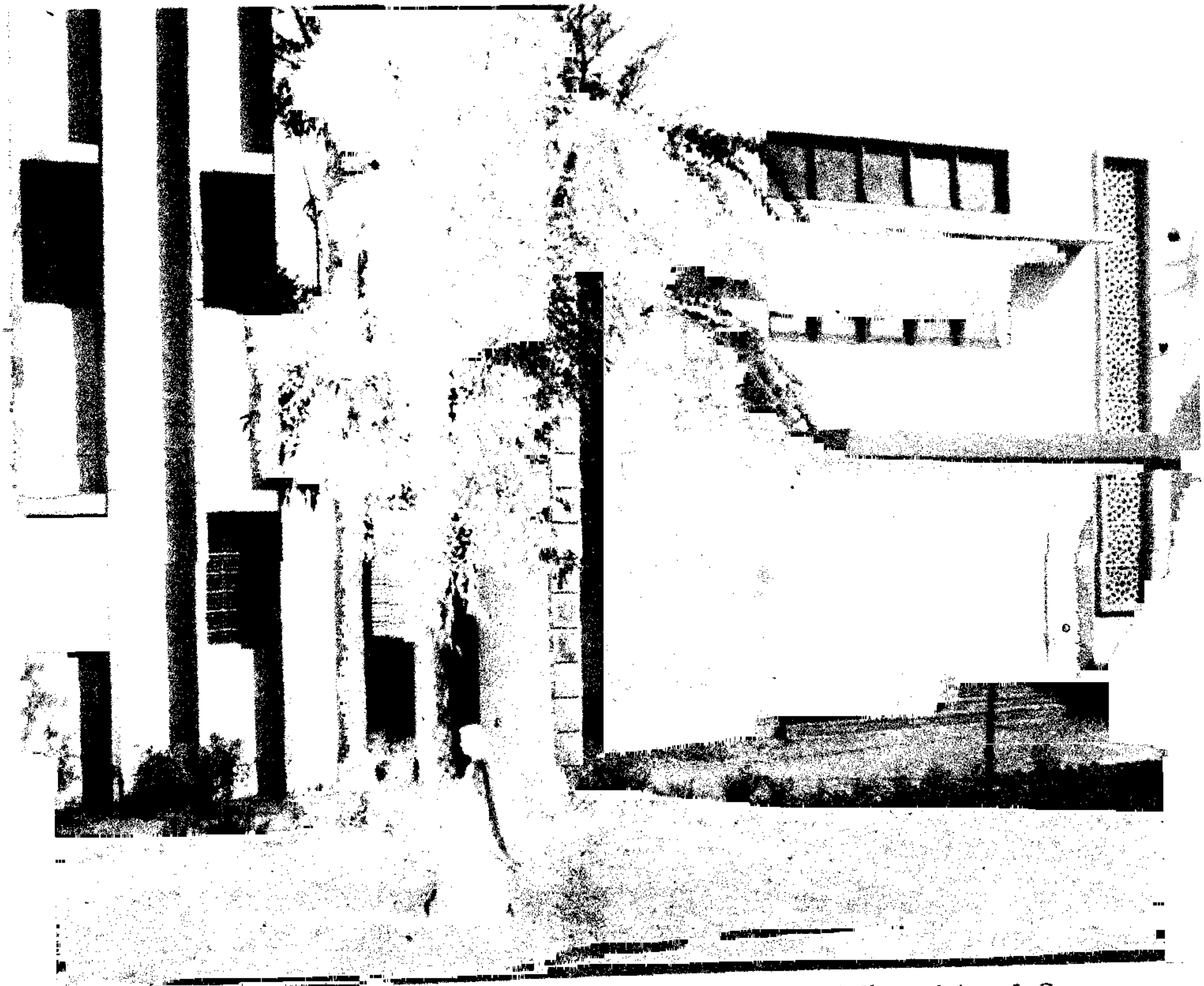
4th March 1994



P G College of Arts & Commerce

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Rajasthan Vidyapeeth
Udaipur

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Editor :
SUTINDER SINGH

Spotlight

Rajasthan Vidyapeeth

A Profile

D. Johar*

Rajasthan Vidyapeeth, Udaipur plays host to the 239th meeting of the Standing Committee of the Association of Indian Universities being held on 4 March, 1994.

The Rajasthan Vidyapeeth was founded on August 21, 1937 by its present Chancellor, Manishi Pt. Janardhan Rai Nagar, along with his devoted band of workers, as an auxiliary of the National Movement for independence. It was essentially a workers' effort *sans* the strings of the purse of any capitalist with the objective to banish illiteracy and ignorance from the erstwhile State of Mewar, awakening people to their participatory role in the non-violent freedom struggle against British Imperialism and exploitation of the feudal order and to shed-off the age-old obsolete traditions and superstitions. In its initial stage the main planks of its activities were literacy in the rural region and propagation of Hindi as an indigenous and national language by conducting various courses of Hindi Language & Literature, and also collecting folk-songs and folk-tales as to conserve the cultural riches of the past.

The Rajasthan Vidyapeeth is a pilgrimage from literacy to the realm of higher education, confronting and combating the odds and obstructions that came in its way, largely thorny and never rosy, but the undaunted workers with commitment to the cause, made headway with passage of time — opening primary schools, community centres, driving mobile libraries and finally establishing the many institutes of higher learning and developing their dimensions of teaching, research and extension in the districts of Udaipur, Kota and Ajmer.

The Rajasthan Vidyapeeth *'Kul'*, the parent body, got its following units registered separately as 'Rajasthan Vidyapeeth' to become a self-governing society under the Rajasthan Society Registration Act, 1958 :

i. M.V. Shramjeevi College, Udaipur
ii. Udaipur School of Social Work
iii. Institute of Rajasthan Studies
iv. Lok Manya Tilak College of Education
v. Institute of Adult & Continuing Education (Lok Shikshan Pratisthan)
  a. Lok Shikshan Vibhag
  b. Community Centres Vibhag
  c. Janpad
  d. Janata College

Further, on the recommendation of the UGC, the Government of India granted it the status of a University under Clause 3 of the UGC Act, 1956 on January 12, 1987, making it a University Institution.

**Officer on Special Duty, Rajasthan Vidyapeeth, Udaipur.*

This University conducts the following courses in its various constituent units, which are located in its three Campuses in an around the Udaipur city :

Faculty of Arts :

M.A. : History, Sociology, Geography, English, Hindi, Economics and Statistics.

B.A.

Faculty of Commerce :

M.Com. : Business Administration, and Accountancy.

B.Com.

(i) P.G. Diploma in Taxation;
(ii) P.G. Diploma in Marketing & Sales Management

— Diploma in Steno-typing : Hindi/English
— Certificate Course in Steno-typing : Hindi/English

Faculty of Social Work :

Master's Degree in Social Work

Specialisations :

i. Personal Management & Labour Welfare
ii. Family & Child Welfare
iii. Correctional Administration
iv. Psychiatric & Medical Social Work
v. Tribal & Rural Development

Faculty of Education :

Master's Degree in Education

Specialisations :

i. Teacher Education
ii. Educational Administration
iii. Guidance & Counselling

B.Ed. (General
B.Ed. (Child Development)

Its 'Institute of Rajasthan Studies' is basically a Research Institute devoted to studying archaeology and ancient history in its various aspects; Linguistic aspects of Dingle, Apbhransh and Rajasthani and also their literatures; Collection, editing of folk literature; Documentation of research material and also guiding research scholars for the Ph.D. degree in the concerned disciplines. It has recently started 'excavation activity' at Balathal village in Udaipur district which has possibilities of deciphering the dark alleys of the past leading back to the Harrapan civilization and its association with the then existing other civilizations. This project has the financial support of the UGC and is being conducted in collaboration with the Deccan College, Pune.

The Institute has been publishing research journal *"Shodh Patrika"* for the last three decades which is esteemed for its credibility and veracity in the field of oriental research. Besides, it has 94 research publications to its credit. It has plans for an integrated Postgraduate Diploma Course in Archaeology & Museology.

The main thrust of the Vidyapeeth had been on (i) Conservation and preservation of the past and interpreting it for purposes of reconstructing history and understanding of the present; (ii) Literacy & continuing education for the community besides quality education with the necessary restructuring of courses and the corresponding examination reforms. Its 'Institute of Adult & Continuing Education' has a sufficiently large network manned by its 180 permanent functionaries of different stations. Besides its literacy drive, it provides for training of adult educators and the village youth in the varied crafts and organises camps for awareness and motivation programmes. It prepares audio-visual aids for dissemination of knowledge of various developmental programmes and that of social change for the village population in particular, and also publishes literature for the neo-literates. Its ten community centres are the nuclei of community education and are fitted with reading rooms and libraries besides, equipments for cultural activities. It has also been publishing a magazine of social education, the *"Samaj Shikshan"* since the '40s. Its mobile library network covers the urban as well as rural regions of the district to the advantage of a few thousand every year.

The Vidyapeeth has been making incessant efforts to integrate teaching & evaluation and conducts its internal assessment through tutorials, periodic tests, periodic assignments and seminars, besides organising an external examination at the end of every session. This has discouraged selective study, diminished the incidence of the use of unfair means at the examinations and emancipated its student-population from the fear psychosis of examinations, as the examinations are not an appendage but a continuous process in the Vidyapeeth. From the ensuing session it plans to start courses in computer application and computer awareness, for computer literacy has gained essentiality with the growing scientific bias of education.

The following are the salient features of the

Vidyapeeth :

- i. Integration of teaching and evaluation;
- ii. Linkage between teaching and extension;
- iii. Reconstructing and redefining history by conducting excavations;
- iv. Introduction of Foundation and Core Courses — Functional Hindi; Functional English; Book-Keeping; Freedom Movement and National Integration; and Land and the People of Rajasthan;
- v. Flexibility in the choice of optional subjects at inter-faculty level at the undergraduate stage;
- vi. B.Ed. (Child Development) — preparing teachers for pre-primary and primary education;
- vii. Job-oriented Courses :
  - a. P.G. Diploma in Excise and Taxation,
  - b. P.G. Diploma in Marketing and Sales Management,
  - c. Diploma and Certificate Courses in Steno-typing; and
- viii. 94 Research publications and publishing an oriental research journal and an adult education magazine.

With the blessings of our founder and present Chancellor, Shri Janardan Rai Nagar, an eminent litterateur and educationist of vision, and the able guidance of our Vice-Chancellor, Prof. K.K. Vashishtha, and the scholarly and committed academic staff, the Rajasthan Vidyapeeth hopes to make great strides in times to come and play a significant role in the development of the tribal region surrounding it, for the tribal population is at the centre of all its activities, particularly its research and extension programmes.

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Dar-us-Salam, Hyderabad-500 001
Ph. 558010

NOTIFICATION

Applications are invited for the posts mentioned hereunder on the prescribed form so as to reach the Principal, Deccan College of Engineering & Technology, Dar-us-Salam, Hyderabad-500 001, on or before **25-3-1994**. The application forms can be obtained from the Principal on payment of Rs. 25/- (Rupees twenty five only) by DEMAND DRAFT on any Scheduled Bank at Hyderabad drawn in favour of the PRINCIPAL, DECCAN COLLEGE OF ENGINEERING & TECHNOLOGY, Dar-us-Salam, Hyderabad from 10-2-1994 between 10.30 a.m.—3.30 p.m. If desired by post, they will have to send self-addressed stamped envelope affixing Rs. 10.00 postage stamps. The Qualifications, Experience, Specialisation and Scale of Pay for various posts are as prescribed by the Osmania University, Hyderabad, which will be supplied alongwith the Application Form.

CATEGORY

1. PROFESSORS : CE; ME; CSE, IE (Electrical Engg.)
2. ASSISTANT PROFESSORS : CE; ME; CSE; ECE; IE (Electrical Engg.)
3. LECTURERS : CE; ME; CSE; EE; IE (Electrical Engg.)
4. COMPUTER SYSTEM PROGRAMMERS

PRINCIPAL

What Ails Indian Science ?

Pawan Sikka*

India has a long and distinguished tradition in science. The development of S&T in India, during the 19th and early 20th century — with the advent of the colonial rule, did not form an organic extension of the earlier tradition. The outbreak of the Second World War (in 1939) and the dawn of Independence (in 1947) brought about a radical change in the pattern of scientific and technological (S&T) research in India. From the concept of private science, it became the reality of the government science.

The role that science could play in the development of India was realized by the leadership of the country long before Independence. In 1939, the Indian National Congress appointed a National Planning Committee and invited leading scientists to help in formulating plans for economic development and social betterment. Pandit Nehru, in 1938, sent a message to the Silver Jubilee Session of the Indian Science Congress at Calcutta, that :

> "It is science alone that can solve the problems of hunger and poverty, of insanitation and illiteracy, of superstition and deadening customs and traditions, of vast resources running off waste, of a rich country inhabited by starving people. Even more than the present, the future belongs to science and those who make friends with science."

As Nobel Laureate Sir C.V. Raman once remarked :

> "Unless the real importance of pure science and its fundamental influence in the advancement of all knowledge are realized and acted upon, India can't make headway in any direction and attain her place among the nations of the world .... There is only one solution for India's economic problems and that is science, and more science and still more science."

Homi Bhabha in January 1966, in the last speech that he gave in his life, addressing the International Council of Scientific Unions, in Bombay, remarked :

> "What the developed countries have and the under-developed lack is modern science and an economy based on modern technology. The problem of developing the underdeveloped countries is, therefore, the problem of establishing modern science in them and transforming their economy to one based on modern science and technology. An important question which we must consider is whether it is possible to transform the economy of a country to one based on modern technology developed elsewhere without at the same time establishing modern science in the country as a live and vital force. If the answer to this important question is in the negative — and I believe our experience will show that it is — then the problem of establishing science as a live and vital force in a society is an inseparable part of the problem of transforming an industrially underdeveloped to a developed country."

Thus, the political leadership cultivated cordial relations with the leaders of science in the country for the effective development of science and technology towards nation building. This resulted in the evolution of science policy for effective management of natural and human resources and utilization of instruments like education, science, and technology, R & D in industry etc, for the prosperity and economic growth of the country. The sole objective of science policy formulation and planning in India has been to engage the S&T system in setting up a comprehensive programme of permeating science with social action and vice-versa and promoting self-confidence in scientific and technological capabilities of India.

Science Policy for Self Reliance

The policy makers in India had recognized early the role of S&T self reliance for indigenous economic development of the country and had given the due emphasis to S&T development in the socio-economic development five year plans of India. The Indian experience in S&T planning for social and economic reconstruction is perhaps one of the most noteworthy examples that science policy does work. The components of science policy in India are :

* Economic planning which determines priorities for the allocation of financial means;

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*Director, Department of Science and Technology, Govt. of India, New Delhi.

- * Educational planning at all levels, particularly for the training of scientists, engineers, technical experts and specialized workers; and
- * Evaluation of the possibilities of economic and cultural developments on the basis of the availability of men, raw material and other local resources.

A well-thought out science policy system based on :

- — Faith and pride in science at the highest political and bureaucratic levels;
- — Far-sighted and imaginative approach to S&T planning;
- — Intuitively correct responses to advancements occurring in frontier areas of science;
- — Love of learning and search for knowledge in a secular atmosphere and under conditions of free enquiry; and
- — Broad and general support to the scientific enterprise as a whole;

has been the corner stone of Indian model of Science Planning.

The principles and methods of science administration, the nature and quality of science advice, the role of experts in science policy, infrastructure improvements, the organisation of science, research and development in government and industry, the organization of knowledge and information pertaining to S&T, science education, issues of technological utilization and innovation, S&T investments and S&T communications and dissemination in India are governed by a very complex set of group interests, resource constraints, democratic traditions and rising expectations. The scientific enterprise in India consists of government, quasi-government, private, non-profit associations and individual efforts. The government is the largest supporter of S&T activities, employs the largest numbers of S&T personnel, funds, plans and oversees science education and is also the largest single utilizer of products/services and benefits arising out of these S&T efforts.

India has witnessed a phenomenal growth in the number of research laboratories as well as agencies and organizations dealing with science and technology since Independence. The achievement of self reliance in all sectors of the economy has been the main objective of the National Five Year Plans of India, where the scientific and technological components found a significant place. The nation has made a substantial investment on science and technology. This has resulted in the creation of an adequate infrastructure for research and development in a variety of areas, such as agriculture, atomic energy, space, chemical technology and biomedical sciences. A large number of institutions devoted to higher learning have also been established to produce the required manpower. Today, India has a large concentration of scientific and technical manpower. The achievement of India in the sphere of S&T capability building, though commendable, is found to be less than the expectations and potential. Some new directions for the development of S&T towards self reliance are urgently needed in the light of the determinants of innovative activity and utilization of local technology vis-a-vis the imported one to meet the global competition.

There seems to be a general feeling that in spite of our spectacular achievements, specially in some sectors of science and technology, all is not well with regard to the quality of scientific research and higher education. There appears to be a genuine need to carefully examine and analyse various aspects related to the status of science in the country.

Policy Planning

Apex science advisory bodies have played a useful role in analysing the strengths and weaknesses of the various sectors of the Indian economy w.r.t. science and technology suggesting thereby various remedial measures to make it successful. Though certain mechanisms have been evolved to prepare national S&T plans and their integration with the socio-economic plans, there is still a need to strengthen this process, particularly the implementation and follow-up machinery. There is need to look into the non-uniformity and unevenness in the growth of some S&T areas where already there have been large inputs and some other areas which received negligible smaller inputs. Some efforts have been made to correct imbalances. Thus, the basic problem is much more with the thrust of the S&T system than with its size, with the direction of its technological capability than with creation/strengthening of this capability, with optimum allocation of S&T resources than with its magnitude. These science advisory bodies are without links with budgeting and implementing agencies.

While India can rightly be proud of her accomplishments since 1950's, it appears that the implementation of our S&T plans cannot be considered as a total success considering the lack of speed and efficiency with which we have gone about. The implementation process makes heavy demands on the machinery of government which we have not yet succeeded in mobilizing in a bold way. Whether it is due to lack of scientific temper in the masses, a genuine resistance to change, inability of the economic sectors and the scientific agencies to be linked in a cohesive fashion, or merely because of the bureaucratic approach being taken to apply S&T to economic development is something which must be analysed and rectified if we have to implement efficiently and boldly what we plan so carefully and meticulously. There appears to be a disorder in the institutionalisation of science policy making in India.

It is observed that there is no comprehensive science policy of India — but there are various policy instruments issued from time to time for the different sectors of science and technology, such as scientific growth, educational development, environment protection, societal welfare — electronics development, manufacture of essential drugs, intellectual property rights, protection of the consumer, etc to guide the government to promote and regulate their generation, acquisition and development in India.

Also, in these policy-instruments there are several areas of contradictions between them, say in environment, industry and housing, etc. Thus, there is an urgent need for evolving an integrated science policy statement of India — incorporating also the amalgamation between various policy instruments on S&T with the national development plans relating to economic and social conditions of the country.

Budget Allocations

The allocation of financial resources is to the development of science and technology what water is to an oasis. The purpose of the science budget is to establish scientific infrastructure and create capabilities and to advance thereby knowledge and train scientific manpower and these and other ways contribute to the realisation of practical benefits for the society. The budget of the central government is the chief instrument of funding science and technology in India. A large part of the expenditure under the central government is incurred by the major S&T agencies which have their separate individual budgets. Plan allocations for S&T activities have increased from Rs. 20 crores in 1951-56 to Rs. 8,245 crores during 1985-90. The contribution of industry for the R&D is very meagre. It has resulted in the establishment of various S&T organisations in the country, creation of S&T manpower, which is third largest in the world developing thereby capabilities of the S&T system in India.

An interesting feature of the subject is that India does not have a single budget for science and technology, *per se*, but instead allocate financial resources to various scientific areas/departments and agencies. Accordingly, there has been uneven growth of science in India. And the concept of excellence versus accountability in science has gained momentum in the country.

University-industry interaction should be increasingly supported by both internal policy change of the university and external demand for tangible results of the university-industry linkages (both forward and backward) to promote organisational development of both the institutions, development of other R&D institutions to fulfil gaps in the technological infrastructure. Since universities still have to rely largely on public funding, perhaps a tripartite cordial relationship between university, industry and R&D laboratories/government needs to be forged, in many areas of science and particularly in engineering in India.

There is a need for levying an *"Educational Cess"* on the industry which is the main beneficiary of R&D, for contributing appropriately to higher education, including the development of science and technology in the country.

R&D Linkages

The Government of India has recognised the importance of R&D and have recently promoted it in the industrial sector as a major factor in bringing about technological developments in the country. Accordingly, India has achieved self reliance in many areas while near self sufficiency in many others through the promotional measures adopted by the government and the keen interest shown by the industry.

The research relations among universities, R&D laboratories and industry have been academic in nature. Industry has made some efforts (and even imported the technology) to meet the demands of vast population of India, but could not achieve much, due to the existence of an inward-looking economy (to fulfil the domestic needs) in the country. This could create an industrial base, instead of the desired technology base in India.

There are a number of reasons why industrial research in India has apparently failed to deliver the goods. The basic reason for failure is that the industrial research in India tends to be academic rather than a commercial activity and has a few points of contact with the practical hard-handed world of industry which is after all the chief consumer of research results. The average scientific worker in India is interested in research for the sake of research only and this approach is so ingrained in our scientific system that research ability is often measured in terms of the papers published rather than on the basis of practical contribution to industry. The failure of the research activity in India to produce concrete results should be fully investigated.

The country lacks 'commercial instinct' which people in the West possessed; support to scientific research work should come from the industry for the practical application of research done in laboratories and S&T are not the two different fields. Scientists have failed to undertake proper cost benefit analysis, techno-economic feasibility and market demands surveys, and assessment of social needs as the bases for identifying specific research programmes. While the scientists lacked training in these aspects, the exciting management culture is incapable of assessing research programmes from their end use angle.

Further, management of technology seems to be one of the biggest gaps observed in the S&T system in India. There is need to develop know-why culture while importing the know-how from the other advanced countries, as well as close coordination between the academic, industrial and R&D sectors so as to rise above the concept of self reliance for competing in the world market. This calls for the development of a technology-base, rather than the industrial base in the country, so as not only to assimilate the imported technology, but also to create new ones in the country. It is strongly felt that a national policy on 'Quality Assurance' should be pronounced by the government and implemented by various organisations in the country.

Today, we have to look beyond self reliance, because the industrial scenario demands international competition and outward looking economy (which can be termed as export oriented) significant at least in a few areas. The strategy for achieving self reliance has created the S&T capabilities but eroded the spirit of competition. We must evolve a carefully worked out policy for the right mix in our technological efforts because many nations have already adopted such policies to optimize the use of their R&D resources.

Foreign Assistance

International cooperation in science and technology has played a catalytic role in enhancing the "capability-building system" for India leading to development in various sectors of tne economy. Many educational institutions and R&D institutions have been set up in India having foreign educated Indian teachers, and foreign educated R&D scientists, along with assistance in the form of imported equipment and collaborative programmes whose capabilities are at par with world class institutions. World scientific communities have appreciated India's efforts in creating a strong S&T base in the country and have accordingly rendered technical assistance to make these strong enough to face challenges in basic, applied and interdisciplinary areas like Biotechnology, New materials, Informatics, Super conductivity, etc. It opened up new vistas and better avenues, enabling our scientists and engineers to acquire competence of international standing in the fields of education, science and technology for the development of economy of the country.

There is no doubt that we benefited from our international cooperation programmes with the developed countries. But we have also extended cooperation to the developing countries who gained much from us due to commonality of interests and problems. There is an urgent need to understand the strength and weakness of our efforts made in the past 40 years in the area of international cooperation in science and technology and plan joint ventures in a few areas which could deliver results in a time-targeted framework. We must identify certain areas of mutual interest where we can save time, energy, and money while pursuing R&D to achieve results for the welfare of mankind. Development of new or expanded collaborative bilateral international programmes of cooperation in scientific and technical fields should be encouraged where India's resources and R&D capabilities would open up avenues for international leadership by India.

Scientific Structures

We have an experience of several models in the management of science and technology in India. These are :

* Agencies and structures like CSIR, ICAR and ICMR which are multi-institutional and have mandate to develop S&T in very many broad areas;

* Commission structures like Atomic Energy Commission and Space Commission — dealing in focused, time based and large programmes with functional autonomy and have generally performed well.

* At the institutional level there are national laboratories, institutes and centres.

- Other broad type of structures which bring together various agencies and institutions for coordinated purposes i.e. for inter-institutional and/or interdiscipline aspects.

There are many institutional programmes, inter-institutional ones too and mission-mode projects with large investments involving several organisations at different places in the country. It is a challenge as to how to bring them together into an effective management structure to ensure proper returns from such investments. There is, maybe, a need as felt in some quarters for creating a corporate type of structure to manage science in India, so that scientific establishments do not merely remain as organisations but become institutions for better work coordination and greater efficiency, of the world-class, as early as possible.

Conclusion

Thus, while examining the strength and weakness of the science and technology model prevalent in India, it is observed that there is an urgent need to make some significant and structural changes in the system so as to reorient and coordinate the already existing vast S&T infrastructure, manpower, finance, R&D culture for the generation of indigenous and absorption of imported know-how, etc and permit more rapid S&T progress in the country. The proposed National Science and Technology Commission (NSTC) for India, should incorporate :

- National Science Policy Research Institute to integrate national policies on S&T with the economic ones, in the country;
- The development of network for reducing time gap between the science policy formulation and its implementation in the country.
- A national advisory body on financing science so as to ensure uniform development of science and technology in the country (since India does not have a single budget for Science & Technology);
- National Committee for International S&T Cooperation, as an inter-ministerial body to deal with programme of S&T cooperation having bilateral and mulilateral angles;
- A coordinating mechanism for forging interactions among university — industry — and R&D laboratories;
- Management Information System for coordinating and disseminating the S&T information leading to transfer of technology in India; and
- Strategies to achieve target beyond self reliance and pronounce a national policy on quality assurance, etc.

The National Science and Technology Commission (NSTC), if established, would act as an umbrella for the already existing scientific departments, agencies and R&D laboratories and for promoting and coordinating their multifarious activities towards full utilisation of S&T in the economic development of India.

The development of science and technology in India has been, on the one hand, in relation to the great advances that have taken place in S&T in the world as a whole, and on the other hand, to the compulsions of ensuring that it is relevant and serves the overall purpose of development of the country. The task has really been great for a country like India having large size and vast population. The efforts have met with real success in many areas and have provided experience in a few others. Here, it is encouraging that India has the required scientists and engineers, relevant research establishments, and the tradition of research productivity that make it possible to plan seriously for almost any of these alternatives. There is a vision of science for the 21st century. Given the very substantial capacities and capabilities that the Indian S&T system has now developed, the next decade should be a fruitful one for the application of science and technology towards making India a strong nation in the world.

[The views expressed in this article are the personal views of the author and in no way bind or represent the Department of Science & Technology, Govt. of India.]

References

1. D.M. Bose et al. A *Concise History of Science in India.* Indian National Science Academy, New Delhi, 1971.

2. A. Rahman. *Science and Technology in India, Pakistan, Bangladesh and Sri Lanka.* Longman, London, 1990.

3. MGK Menon and Manju Sharma in *Glimpses of Science in India* (ed) U.S. Srivastava, pp 4-10. Malhotra Publishing Co., New Delhi 1990.

4. Pawan Sikka. Forty years of Indian Science. *Jr. Science and Public Policy.* Vol. 17 No. 1, pp 45-53, Feb 1990, England.

5. *Research & Development Statistics 1990-91.* Govt. of India, Department of Science and Technology, New Delhi 1992.

6. CNR Rao (ed). *Perspectives in Science and Technology.* SACPM Document, Vikas Publishing House, New Delhi 1990.

7. Najma Heptullah. *India's Progress in Science and Technology.* Oxford and IBH Pub. Co., New Delhi 1986.

8. Pawan Sikka. Science Policy in India. *Science & Culture* V 97, Nos. 1 and 2, pp 4-13, Jan-Feb 1991, Calcutta.

9. Pawan Sikka. *Towards a Balanced development of Science* in India. *Financial Express,* New Delhi. April 1992.

10. Pawan Sikka. Excellence Vs Accountability in Indian Science. *University News,* 8 March 1993, New Delhi.

11. Pawan Sikka. *Management of Science in India.* D.Sc. Thesis. Meerut University, Meerut 1993.